CHANDLER ASSET MANAGEMENT

Selecting Investments to Meet Your Goals

Survey of Products and Concepts of Risk

Advanced Concepts and Practices for Investing Public Funds

California Debt and Investment Advisory Commission Workshop

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Kay Chandler, CFA

AB 943 Survey Investment Instruments in use in California December 2005

By County (Portfolio Size)

Investment Instrument	1st Quartile: Under $89M	2nd Quartile: $89M to $433M	3rd Quartile: $433M to $1.6B	4th Quartile: Over $1.6B
U.S. Treasury Obligations	43%	17%	62%	75%
U.S. Agency Obligations	79%	92%	100%	100%
Commercial Paper	35%	75%	62%	100%
Repurchase Agreements	0%	17%	38%	58%
Medium-term Notes	57%	58%	77%	75%
Money Market Funds	50%	33%	46%	33%
Negotiable Certificates of Deposit	14%	50%	46%	100%
Local Agency Investment Fund	86%	100%	92%	58%

By City (Portfolio Size)

Investment Instrument	1st Quartile: Under $13M	2nd Quartile: $13M to $39M	3rd Quartile: $39M to $94M	4th Quartile: Over $94M
U.S. Treasury Obligations	8%	6%	38%	55%
U.S. Agency Obligations	25%	63%	77%	91%
Commercial Paper	0%	13%	15%	18%
Repurchase Agreements	0%	0%	0%	0%
Medium-term Notes	17%	19%	7%	27%
Money Market Funds	33%	38%	46%	38%
Negotiable Certificates of Deposit	25%	31%	8%	18%
Local Agency Investment Fund	100%	100%	100%	91%

Source: California Debt and Investment Advisory Commission

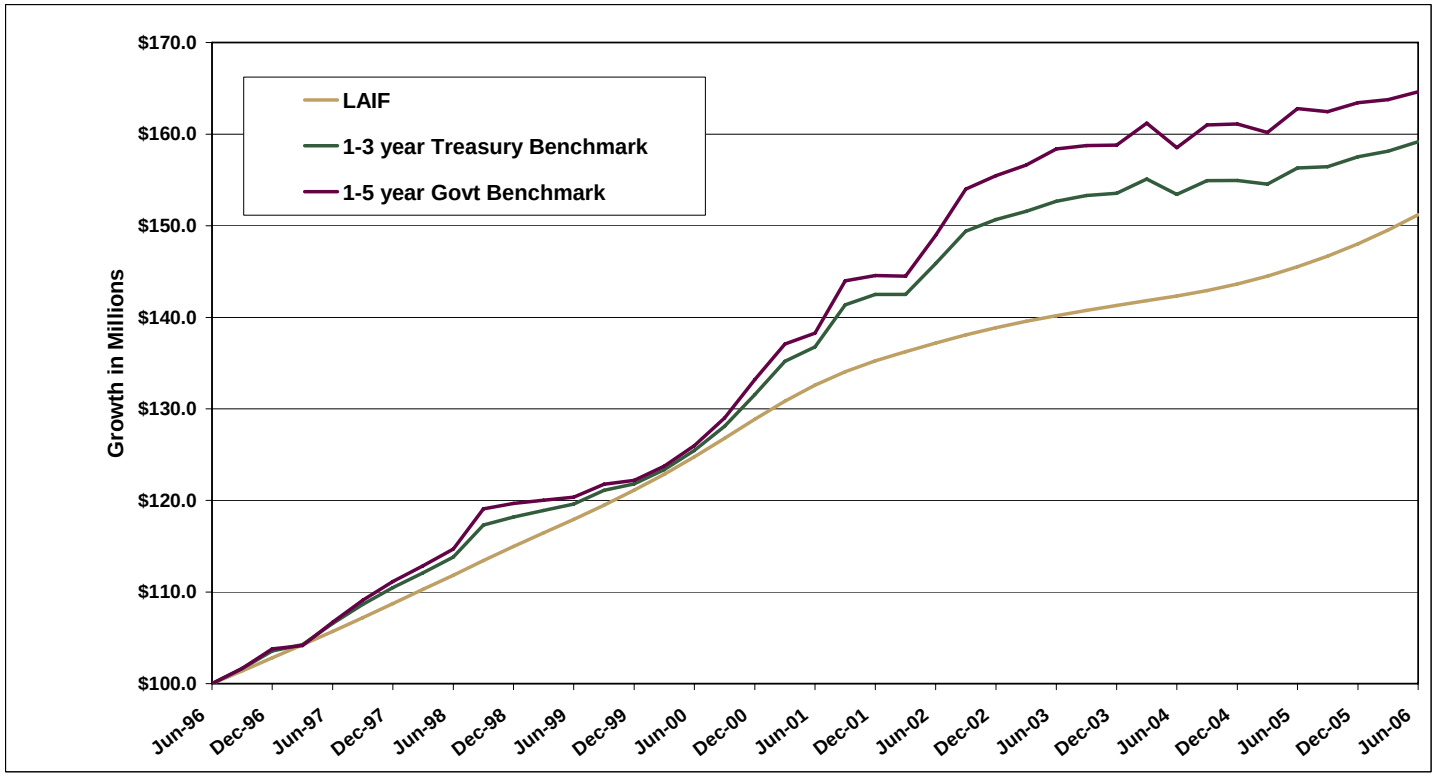
Identifying Portfolio Risks

- Market Risk
- Credit Risk (Non-governmental Issuers)
- Reinvestment risk (Callables/Mortgage-Backed Securities)

The Definition of Market Risk

- The risk that bond/portfolio prices and yields will fluctuate due to changes in the general level of interest rates
  - When interest rates rise, bond prices fall because the yield on the bond is *lower* than market yields
  - When interest rates fall, bond prices rise because the yield on the bond is *higher* than market yields

Higher Duration Portfolios Generate Higher Expected Returns

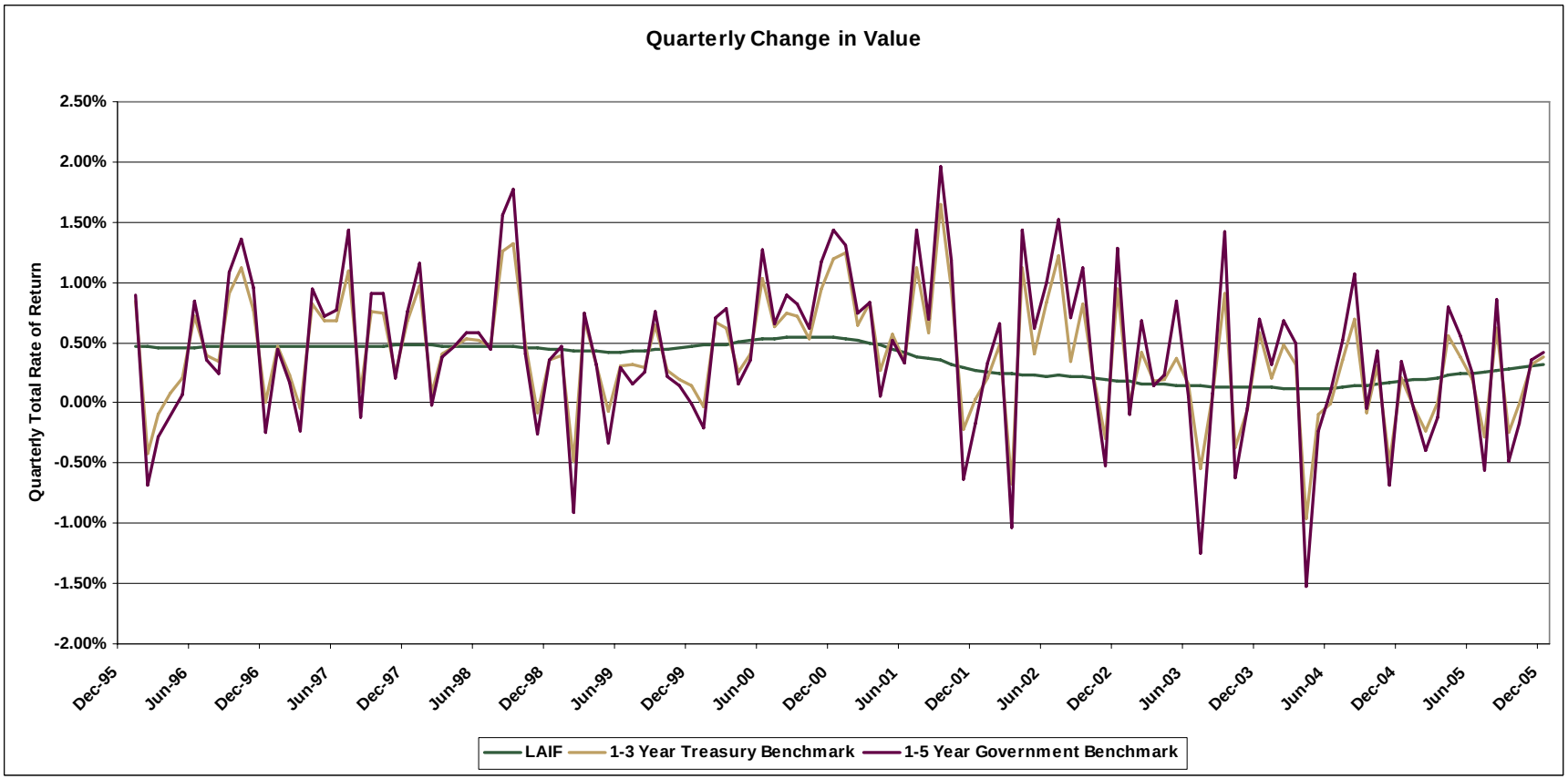


Value on 6/30/2006 of $100 million invested 6/30/1996			
	6/30/06	Return	Duration
LAIF	$151,199,117	4.22%	0.44
1-3 year Treasury Benchmark	$159,157,330	4.76%	1.48
1-5 year Govt Benchmark	$164,612,085	5.11%	2.28

Source: LAIF return information provided by State Treasurer
Source: Index return information provided by Merrill Lynch

Higher Duration Portfolios Generate More Volatility

Quarterly Returns: LAIF, 1-3 Year, and 1-5 Year Government Benchmarks



Source: LAIF return information provided by State Treasurer
Source: Index return information provided by Merrill Lynch

Measures of Market Risk

- Term to maturity
- Duration
  - Macaulay Duration
  - Modified Duration
  - Effective Duration

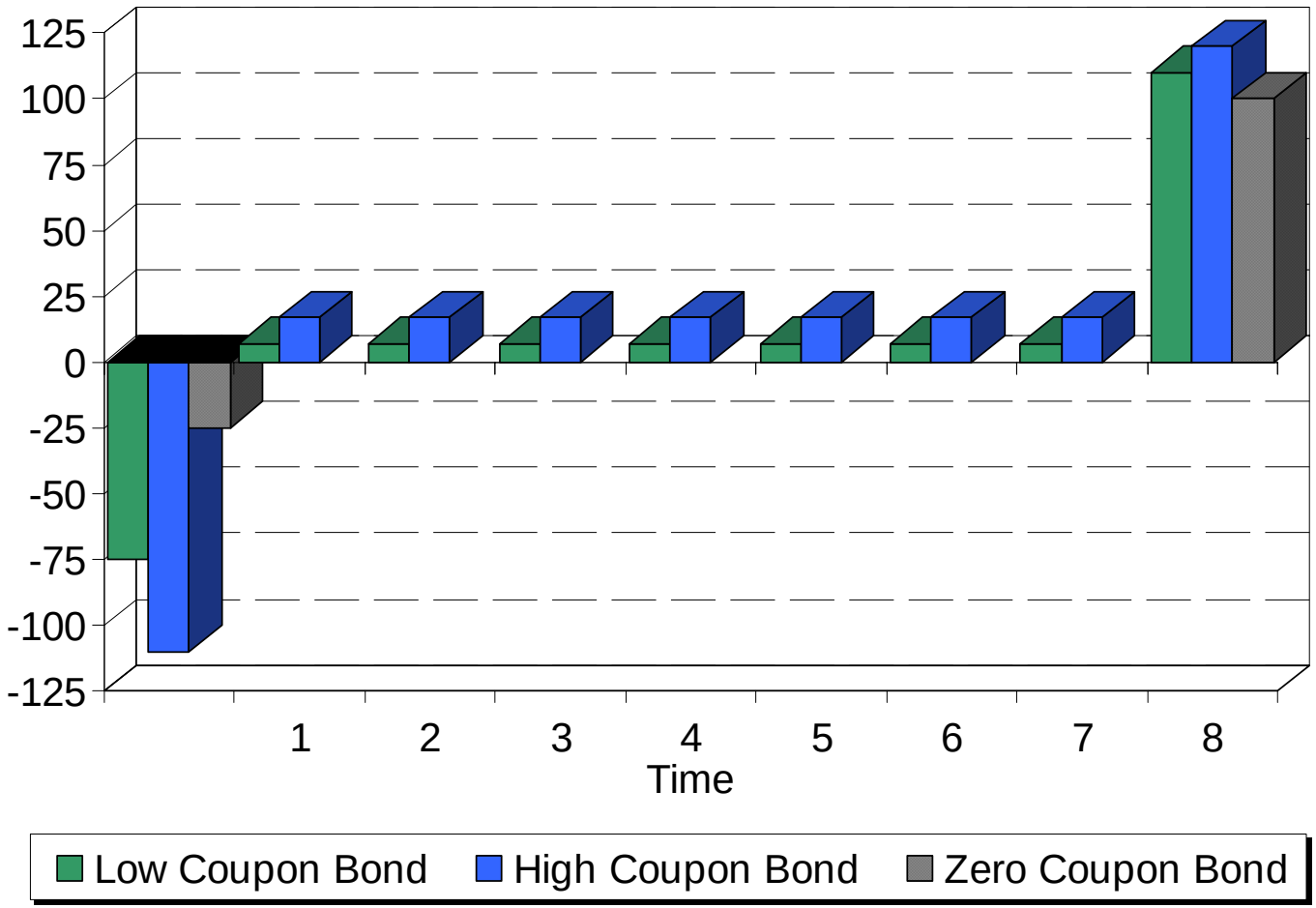
Measures of Market Risk

- Term to Maturity: The interval between the purchase date of a bond and the stated date on which the final interest and principal payment will be made
  - Fixed maturity bonds
  - Pass-through bonds
  - Callable bonds

Term to Maturity Is Not a Sufficient Measure

- Definitions for illustration
  - Low-coupon bond—the coupon rate (interest rate, face rate) is lower than current market
  - High-coupon bond—the coupon rate is higher than current market
  - Zero-coupon bond—the bond pays no interest until final maturity

Comparison of Cash Flows



Duration Provides More Information About Market Risk

- *Macaulay duration* represents the average time that a bond is outstanding
  - Taking into account the timing of the expected cashflows from the bond
  - Taking into account the size of the expected cashflows from the bond
- Modified duration is derived from Macaulay duration
- *Modified Duration* is the percent change in value of a fixed maturity, fixed coupon bond for a 100 basis point change in yields

Calculating Macaulay Duration

Macaulay Duration =

$$\left[\frac{1C}{(1+y)}+\frac{2C}{(1+y)^2}+\ldots+\frac{nC}{(1+y)^n}+\frac{nM}{(1+y)^n}\right]\frac{1}{P}$$

Where:

C=cashflow from semi-annual interest payment

y = ½ the yield to maturity

n= Number of semi-annual interest periods

M= Cashflow from principal value at maturity

P= price of the bond

Each of these terms is the *present value* of the future cashflow, weighted by time until receipt.

Source: Fabozzi, Frank. *Bond Markets, Analysis & Strategies*. Prentice-Hall, Inc. 1996

Calculating Macaulay Duration

Macaulay Duration =

$$\frac{\sum_{t=1}^{n} \frac{tC}{(1+y)^t} + \frac{nM}{(1+y)^n}}{P}$$

Where:

t=period of cashflow

C= semi-annual interest from coupon

y = ½ the yield to maturity

n= Number of semi-annual interest periods

M= Principal value at maturity

P= price of the bond

Source: Fabozzi, Frank. *Bond Markets, Analysis & Strategies*. Prentice-Hall, Inc. 1996

Modified Duration and Effective Duration

$$\text{Modified Duration} = \frac{(-1)\ \text{Macaulay Duration}}{[(1+y)/200]}$$

Effective Duration:

Accounts for the change in price of a bond with embedded options

Source: Fabozzi, Frank. *Bond Markets, Analysis & Strategies*. Prentice-Hall, Inc. 1996

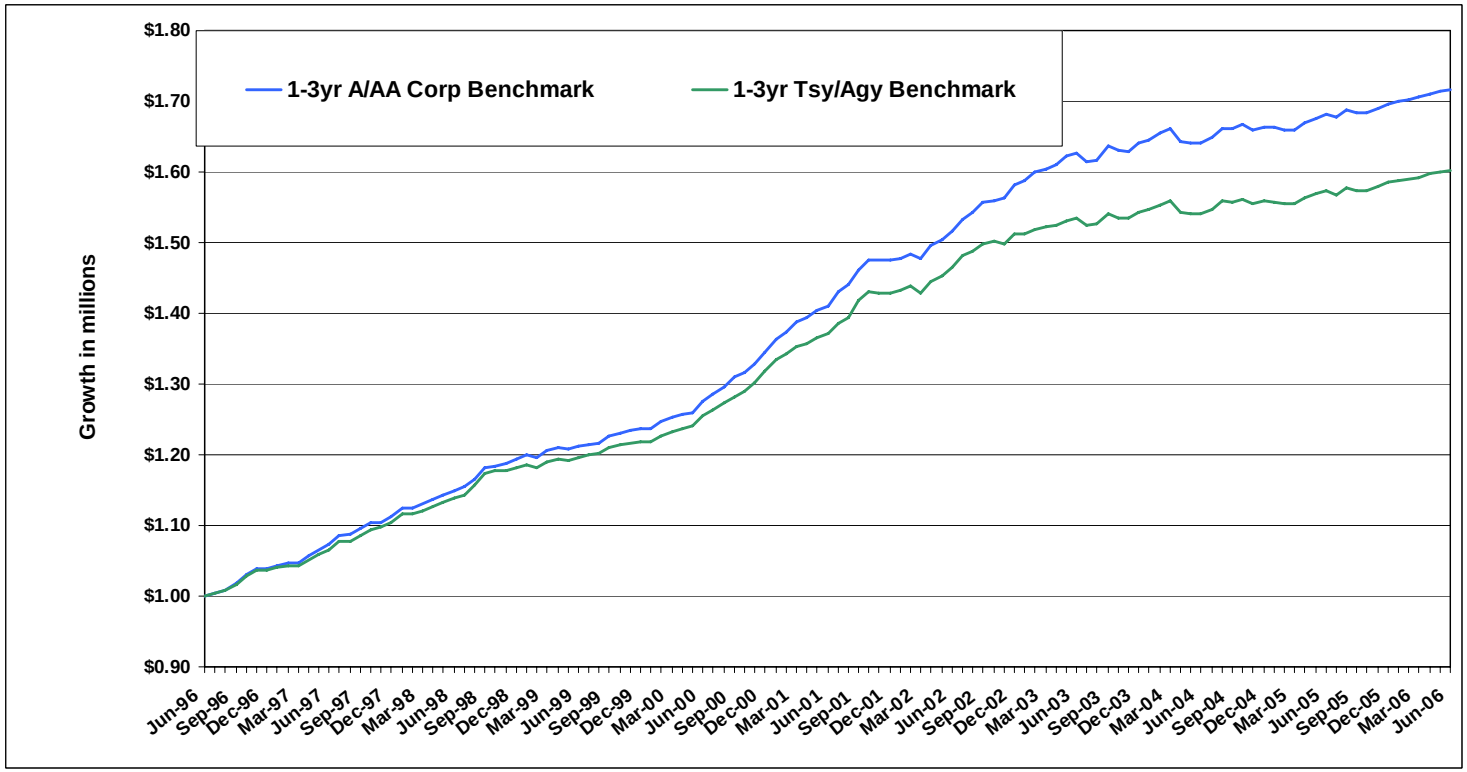
Assuming Credit Risk Can Improve Returns

…When resources are available to monitor credit quality appropriately.

■ Treasuries are the safest, considered to have ZERO credit risk	■ No credit research necessary
■ Federal agency securities considered next safest	■ Monitor agency news, rating agency actions
■ AAA and AA	■ Understand the business—risks and opportunities; monitor news and rating agency watch lists
■ A	■ With greater diligence--understand the business—risks and opportunities; monitor news and rating agency watch lists. Be quick to act on credit changes

Assuming Credit Risk Can Improve Returns

Comparison of 1-3 Year A-AA Corporates and 1-3 Year Governments



Value on 6/30/2006 of $10 million invested 6/30/1996		
	6/30/2006	Annualized Return
1-3 Year A/AA Corp Benchmark	$17,170,665	5.55%
1-3 Year Tsy/Agy Benchmark	$16,024,565	4.83%

Source: Index return information provided by Merrill Lynch

Resource for Public Fund Investing in California